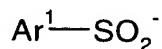


What is claimed is:

1. A composition comprising:

an arylsulfinate salt having an anion of Formula I



I

and having a cation that contains at least one carbon atom and either a positively charged nitrogen atom or a positively charged phosphorus atom, wherein Ar¹ is a substituted phenyl, an unsubstituted or substituted C₇₋₃₀ aryl, or an unsubstituted or substituted C₃₋₃₀ heteroaryl, said substituted Ar¹ having a substituent that is an electron withdrawing group or an electron withdrawing group in combination with an electron donating group; and

a triarylsulfonium salt.

2. The composition of claim 1, wherein the Ar¹ group of the arylsulfinate salt is anthryl, naphthyl, acenaphthyl, phenanthryl, phenanthrenyl, perylenyl, anthracenyl, anthraquinonyl, anthronyl, biphenyl, terphenyl, 9,10-dihydroanthracenyl, or fluorenyl, wherein said Ar¹ group is unsubstituted or substituted with an electron withdrawing group or an electron withdrawing group in combination with an electron donating group.

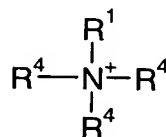
3. The composition of claim 1, wherein the Ar¹ group of the arylsulfinate salt is quinolinyl, isoquinolinyl, quinazolinyl, quinoxalinyl, cinnolinyl, benzofuranyl, benzomercaptophenyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, indolyl, phthalazinyl, benzothiadiazolyl, benzotriazinyl, phenazinyl, phenanthridinyl, acridinyl, or indazolyl, wherein said Ar¹ group is unsubstituted or substituted with an electron withdrawing group or electron withdrawing group in combination with an electron donating group.

4. The composition of claim 1, wherein the Ar¹ group of the arylsulfinate salt is a substituted phenyl, an unsubstituted or substituted naphthyl, or an unsubstituted or substituted anthraquinonyl, said substituted Ar¹ group having a substituent that is an

electron withdrawing group or an electron withdrawing group in combination with an electron donating group.

- 5 5. The composition of claim 1, wherein the Ar¹ group of the arylsulfinate salt is phenyl substituted with an electron withdrawing group selected from halo, cyano, fluoroalkyl, perfluoroalkyl, carboxy, alkoxycarbonyl, aryloxy, carbonyl, sulfo, alkoxysulfonyl, aryloxysulfonyl, perfluoroalkylsulfonyl, alkylsulfonyl, azo, alkenyl, alkynyl, dialkylphosphonato, diarylphosphonato, aminocarbonyl, or combinations thereof.
- 10 6. The composition of claim 1, wherein the anion of the arylsulfinate salt is 4-chlorobenzenesulfinate, 4-cyanobenzenesulfinate, 4-ethoxycarbonylbenzenesulfinate, 4-trifluoromethylbenzenesulfinate, 3-trifluoromethylbenzenesulfinate, 1-anthraquinone sulfinate, 1-naphthalenesulfinate, or 2-naphthalenesulfinate.
- 15 7. The composition of claim 1, wherein the cation of the arylsulfinate salt is a ring structure comprising a 4 to 12 member heterocyclic group having a positively charged nitrogen atom, said heterocyclic being saturated or unsaturated and having up to 3 heteroatoms selected from oxygen, sulfur, nitrogen, or combinations thereof, wherein
- 20 said ring structure is unsubstituted or substituted with a substituent selected from an alkyl, aryl, acyl, alkoxy, aryloxy, halo, mercapto, amino, hydroxy, azo, cyano, carboxy, alkoxycarbonyl, aryloxy, carbonyl, sulfo, alkoxysulfonyl, aryloxysulfonyl, perfluoroalkylsulfonyl, alkylsulfonyl, azo, alkenyl, alkynyl, dialkylphosphonato, diarylphosphonato, aminocarbonyl, or combinations thereof.
- 25 8. The composition of claim 7, wherein said heterocyclic group is bicyclic.
9. The composition of claim 7, wherein said heterocyclic group is fused to a cyclic or bicyclic group that is saturated or unsaturated and that has 0 to 3 heteroatoms.
- 30 10. The composition of claim 7, wherein said heterocyclic group is fused to an aromatic ring having 0 to 3 heteroatoms.

11. The composition of claim 1, wherein the cation of the arylsulfinate salt is of Formula II



II

5 where

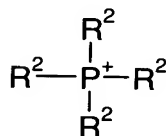
R^1 is an unsubstituted alkyl, an alkyl substituted with a hydroxy, an unsubstituted aryl, or an aryl substituted with an alkyl, hydroxy, or combinations thereof; and

10 each R^4 is independently hydrogen, an unsubstituted alkyl, an alkyl substituted with a hydroxy, an unsubstituted aryl, or an aryl substituted with an alkyl, hydroxy, or combinations thereof.

12. The composition of claim 11, wherein the cation of the arylsulfinate salt is a tetraalkylammonium ion.

15

13. The composition of claim 1, wherein the cation of the arylsulfinate salt is of Formula III



III

20 where each R^2 is independently an unsubstituted alkyl, an alkyl substituted with a hydroxy, an unsubstituted aryl, or an aryl substituted with an alkyl, hydroxy, or combinations thereof.

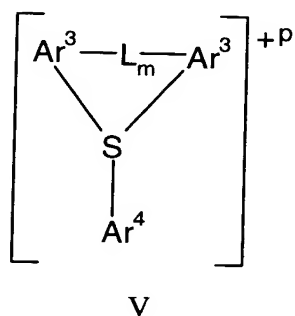
25 14. The composition of claim 1, wherein the anion of the arylsulfinate salt is a benzenesulfinate substituted with an electron withdrawing group electron selected from halo, cyano, fluoroalkyl, perfluoroalkyl, carboxy, alkoxycarbonyl, aryloxycarbonyl, halocarbonyl, formyl, carbonyl, sulfo, alkoxysulfonyl, aryloxysulfonyl, perfluoroalkylsulfonyl, alkylsulfonyl, azo, alkenyl, alkynyl, dialkylphosphonato,

diarylphosphonato, aminocarbonyl, or combinations thereof and the cation of the arylsulfinate salt is a tetraalkylammonium ion.

15. The composition of claim 1, wherein the arylsulfinate salt is
 5 tetrabutylammonium 4-chlorobenzenesulfinate, tetrabutylammonium 4-cyanobenzenesulfinate, tetrabutylammonium 4-ethoxycarbonylbenzenesulfinate, tetrabutylammonium 4-trifluoromethylbenzenesulfinate, tetrabutylammonium 3-trifluoromethylbenzenesulfinate, tetrabutylammonium 1-naphthalenesulfinate, tetrabutylammonium 2-naphthalenesulfinate, or tetrabutylammonium 1-anthraquinonesulfinate.
 10

16. The composition of claim 1, wherein the arylsulfinate salt is
 15 tetrabutylammonium 4-ethoxycarbonylbenzenesulfinate or tetrabutylammonium 4-cyanobenzenesulfinate.

17. The composition of claim 1, where the triarylsulfonium salt has a cation according to Formula V



20 wherein

each Ar^3 and Ar^4 are independently a C_{6-30} aryl or a C_{3-30} heteroaryl that is substituted or substituted with one or more substituents, each substituent having up to 30 carbon atoms and up to 10 heteroatoms selected from N, S, O, P, As, Si, Sb, B, or Ge;

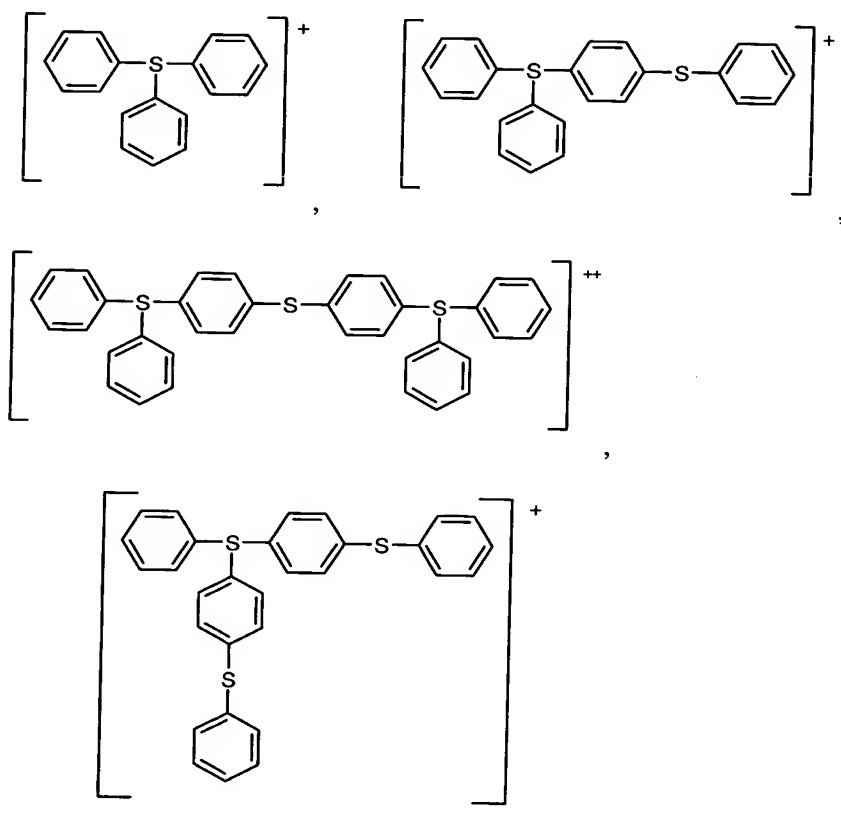
25 L is a divalent linking group selected from a single bond, oxo, thio, sulfinyl, carbonyl, sulfonyl, methylene, or imino;

p is an integer equal to or greater than 1; and

m is an integer equal to 0 or 1.

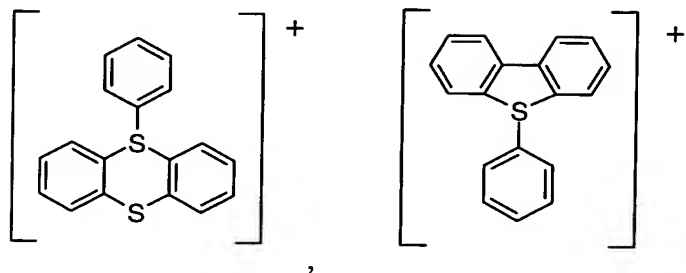
18. The composition of claim 1, wherein the triarylsulfonium salt has an anion selected from AsF_6^- , SbF_6^- , BF_4^- , PF_6^- , CF_3SO_3^- , $\text{HC}(\text{SO}_2\text{CF}_3)_2^-$, $\text{C}(\text{SO}_2\text{CF}_3)_3^-$, $\text{N}(\text{SO}_2\text{CF}_3)_2^-$, tetraphenylborate, tetra(pentafluorophenyl)borate, and tetra(3,5-bistrifluoromethylphenyl)borate, p-toluenesulfonate, or combinations thereof.

19. The composition of claim 1, wherein the triarylsulfonium salt has a cation selected from



- or combinations thereof that are unsubstituted or substituted with one or more substituents selected from alkyl, alkylcarbonyloxy, alkynyl, alkoxy, alkoxy carbonyl, alkylthio, arylthio, aralkyl, alkenyl, aryl, arylcarbonyloxy, arylcarbonylamido, alkylcarbonylamido, aryloxy, aryloxy carbonyl, alkoxy sulfonyl, aryloxy sulfonyl, alkylsulfonamido, N-alkylaminocarbonyl, N-arylamino carbonyl, N-alkylsulfamyl, N-arylsulfamyl, alkylsulfonyl, arylsulfonyl, perfluoroalkyl, perfluoroalkylsulfonyl, azo, boryl, halo, hydroxy, mercapto, diarylsilino, diarylstibino, trialkylgermano, trialkylsiloxo, or combinations thereof.

20. The composition of claim 1, where the triarylsulfonium salt has a cation selected from



5 or combinations thereof that are unsubstituted or substituted with one or more substituents selected from alkyl, alkylcarbonyloxy, alkynyl, alkoxy, alkoxy carbonyl, alkylthio, arylthio, aralkyl, alkenyl, aryl, arylcarbonyloxy, arylcarbonylamido, alkylcarbonylamido, aryloxy, aryloxy carbonyl, alkoxy sulfonyl, aryloxy sulfonyl, alkylsulfonamido, N-alkylaminocarbonyl, N-arylamino carbonyl, N-alkylsulfamyl, N-
10 arylsulfamyl, alkylsulfonyl, arylsulfonyl, perfluoroalkyl, perfluoroalkylsulfonyl, azo, boryl, halo, hydroxy, mercapto, diarylarsino, diarylstibino, trialkylgermano, trialkylsiloxo, or combinations thereof.

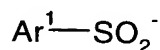
21. The composition of claim 1, wherein the triarylsulfonium salt has a cation
15 selected from triphenylsulfonium, diphenylnaphthylsulfonium, tritolylsulfonium, anisyl diphenylsulfonium, 4-butoxyphenyldiphenylsulfonium, 4-tert-butylphenyldiphenylsulfonium, 4-chlorophenyldiphenylsulfonium, tris(4-phenoxyphenyl)sulfonium, 4-acetylphenyldiphenylsulfonium, tris(4-thiomethoxyphenyl)sulfonium, or 4-acetamidophenyldiphenylsulfonium.

22. The composition of claim 1, further comprising an ethylenically unsaturated monomer.

23. The composition of claim 22, wherein the ethylenically unsaturated monomer
25 comprises a monoacrylate, monomethacrylate, diacrylate, dimethacrylate, polyacrylate, polymethacrylate, or combinations thereof.

24. The composition of claim 1, wherein the arylsulfinate salt has an oxidation potential in N,N-dimethylformamide of 0.0 to +0.4 volts versus a silver/silver nitrate reference electrode.

- 5 25. A composition comprising an ethylenically unsaturated monomer and a triarylsulfonium arylsulfinate salt comprising:
an anion of Formula I

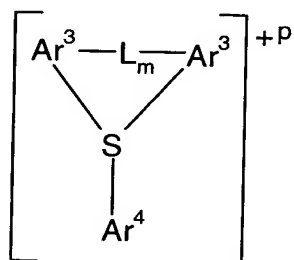


I

- 10 wherein Ar^1 is a substituted phenyl, an unsubstituted or substituted C_{7-30} aryl, or an unsubstituted or substituted C_{3-30} heteroaryl, said substituted Ar^1 having a substituent that is an electron withdrawing group or an electron withdrawing group in combination with an electron donating group; and
and a triarylsulfonium cation.

15

26. The composition of claim 25, wherein the triarylsulfonium arylsulfinate salt has a cation according to Formula V



V

- 20 wherein

each Ar^3 and Ar^4 are independently a C_{6-30} aryl or a C_{3-30} heteroaryl that is substituted or substituted with one or more substituents, each substituent having up to 30 carbon atoms and up to 10 heteroatoms selected from N, S, O, P, As, Si, Sb, B, or Ge; and

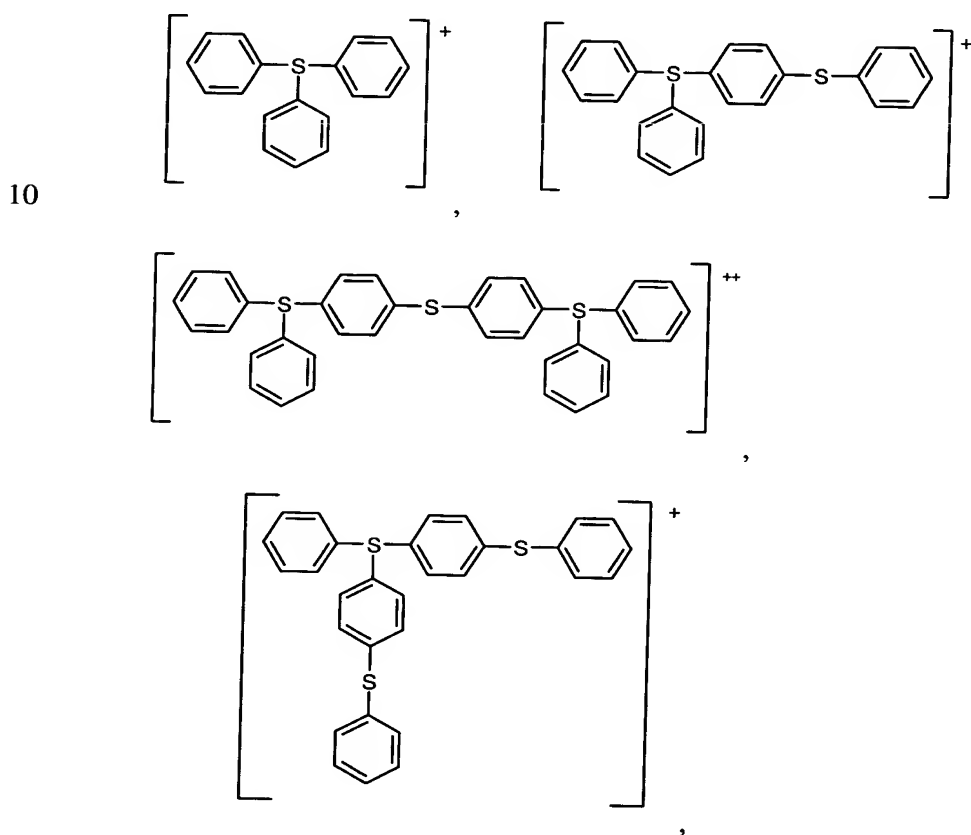
- 25 L is a divalent linking group selected from a single bond, oxo, thio, sulfinyl, carbonyl, sulfonyl, methylene, or imino;

p is an integer equal to or greater than 1; and

m is an integer equal to 0 or 1.

27. The composition of claim 25, wherein the Ar¹ group of the anion of the triarylsulfonium arylsulfinate salt is substituted phenyl, unsubstituted or substituted naphthyl, or an unsubstituted or substituted anthraquinonyl, said substituted Ar¹ group having a substituent that is an electron withdrawing group or an electron withdrawing group in combination with an electron donating group.

28. The composition of claim 25, where the triarylsulfonium salt has a cation selected from



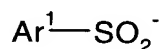
or combinations thereof that are unsubstituted or substituted with one or more substituents selected from alkyl, alkylcarbonyloxy, alkynyl, alkoxy, alkoxy carbonyl, alkylthio, arylthio, aralkyl, alkenyl, aryl, arylcarbonyloxy, arylcarbonylamido, alkylcarbonylamido, aryloxy, aryloxy carbonyl, alkoxy sulfonyl, aryloxy sulfonyl, alkylsulfonamido, N-alkylaminocarbonyl, N-arylaminocarbonyl, N-alkylsulfamyl, N-arylsulfamyl, alkylsulfonyl, arylsulfonyl, perfluoroalkyl, perfluoroalkylsulfonyl, azo,

boryl, halo, hydroxy, mercapto, diarylarsino, diarylstibino, trialkylgermano, trialkylsiloxo, or combinations thereof.

29. A method of photopolymerization comprising irradiating a photopolymerizable composition with actinic radiation until the photopolymerizable composition gels or hardens, said photopolymerizable composition comprising:

an ethylenically unsaturated monomer;

an arylsulfinate salt having an anion of Formula I



I

and having a cation that contains at least one carbon atom and either a positively charged nitrogen atom or a positively charged phosphorus atom, wherein Ar¹ is a substituted phenyl, an unsubstituted or substituted C₇₋₃₀ aryl, or an unsubstituted or substituted C₃₋₃₀ heteroaryl, said substituted Ar¹ having a substituent that is an electron withdrawing group or an electron withdrawing group in combination with an electron donating group; and

a triarylsulfonium salt.

30. The method of claim 29, wherein the actinic radiation is in the range of 250 to 1000 nanometers.

31. The method of claim 29, wherein the actinic radiation is in the range of 250 to 850 nanometers.

32. The method of claim 29, wherein the arylsulfinate salt has an anion that is a benzenesulfinate substituted with an electron withdrawing group selected from halo, cyano, fluoroalkyl, perfluoroalkyl, carboxy, alkoxycarbonyl, aryloxy carbonyl, halocarbonyl, formyl, carbonyl, sulfo, alkoxysulfonyl, aryloxysulfonyl, perfluoroalkylsulfonyl, alkylsulfonyl, azo, alkenyl, alkynyl, dialkylphosphonato, diarylphosphonato, aminocarbonyl, or combinations thereof and the cation of the arylsulfinate salt is a tetraalkylammonium ion.

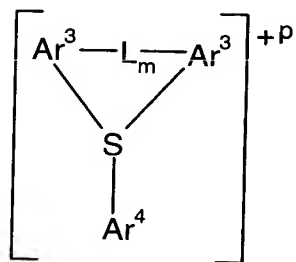
33. The method of claim 29, wherein the Ar¹ group of the arylsulfinate salt is naphthyl or anthraquinonyl that is unsubstituted or substituted with an electron withdrawing group or an electron withdrawing group in combination with an electron donating group.

5

34. The method of claim 29, wherein the arylsulfinate salt has a cation that is a tetraalkylammonium ion.

10

35. The method of claim 29, wherein the triarylsulfonium salt has a cation according to Formula V



V

wherein

15 each Ar³ and Ar⁴ are independently a C₆₋₃₀ aryl or a C₃₋₃₀ heteroaryl that is substituted or substituted with one or more substituents, each substituent having up to 30 carbon atoms and up to 10 heteroatoms selected from N, S, O, P, As, Si, Sb, B, or Ge; and

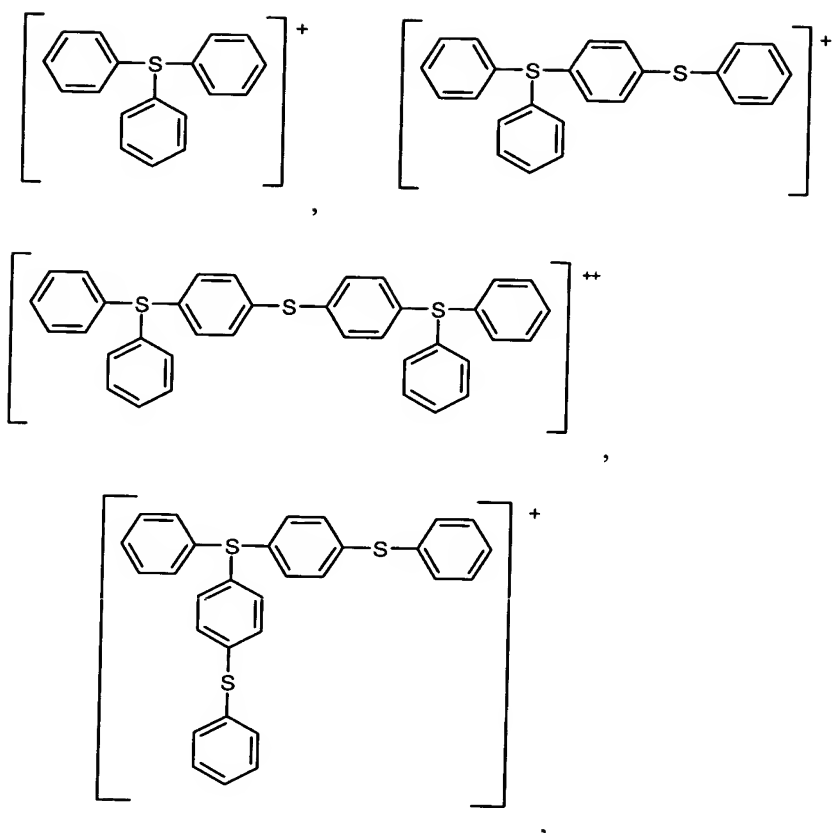
L is a divalent linking group selected from a single bond, oxo, thio, sulfinyl, carbonyl, sulfonyl, methylene, or imino;

20

p is an integer equal to or greater than 1; and

m is an integer equal to 0 or 1.

36. The method of claim 29, wherein the triarylsulfonium salt has a cation selected from



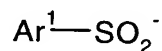
or combinations thereof that are unsubstituted or substituted with one or more
 5 substituents selected from alkyl, alkylcarbonyloxy, alkynyl, alkoxy, alkoxycarbonyl, alkylthio, arylthio, aralkyl, alkenyl, aryl, arylcarbonyloxy, arylcarbonylamido, alkylcarbonylamido, aryloxy, aryloxycarbonyl, alkoxysulfonyl, aryloxysulfonyl, alkylsulfonamido, N-alkylaminocarbonyl, N-arylamino carbonyl, N-alkylsulfamyl, N-arylsulfamyl, alkylsulfonyl, arylsulfonyl, perfluoroalkyl, perfluoroalkylsulfonyl, azo,
 10 boryl, halo, hydroxy, mercapto, diarylarsino, diarylstibino, trialkylgermano, trialkylsiloxo, or combinations thereof.

37. The method of claim 29, wherein the triarylsulfonium salt has an anion that is
 15 selected from AsF_6^- , SbF_6^- , BF_4^- , PF_6^- , CF_3SO_3^- , $\text{HC}(\text{SO}_2\text{CF}_3)_2^-$, $\text{C}(\text{SO}_2\text{CF}_3)_3^-$, $\text{N}(\text{SO}_2\text{CF}_3)_2^-$, tetraphenylborate, tetra(pentafluorophenyl)borate, and tetra(3,5-bistrifluoromethylphenyl)borate, p-toluenesulfonate, or combinations thereof.

38. A method of photopolymerization comprising irradiating a photopolymerizable composition with actinic radiation until the photopolymerizable composition gels or hardens, said photopolymerizable composition comprising:

an ethylenically unsaturated monomer;

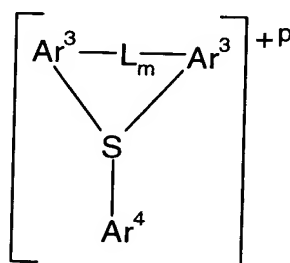
5 an arylsulfinate triarylsulfonium salt having an anion of Formula I



I

and having a cation that is an triarylsulfonium ion, wherein Ar¹ is a substituted phenyl, an unsubstituted or substituted C₇₋₃₀ aryl, or an unsubstituted or substituted C₃₋₃₀ heteroaryl, said substituted Ar¹ having a substituent that is an electron withdrawing group or an electron withdrawing group in combination with an electron donating group.

39. The method of claim 38, wherein the cation of the triarylsulfonium arylsulfinate salt has a cation according to Formula V



V

wherein

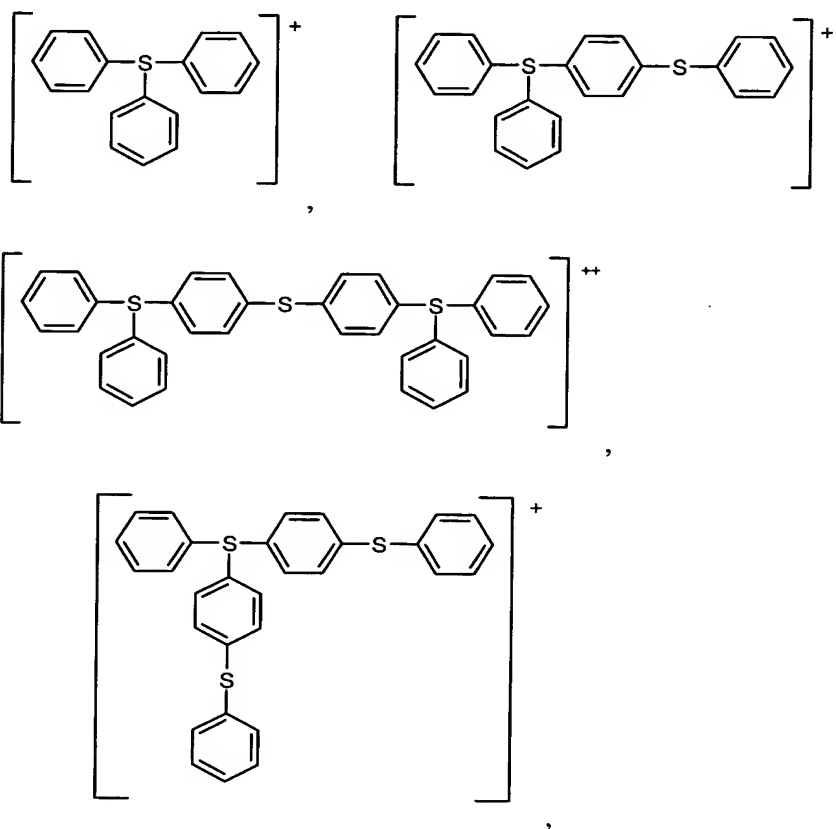
each Ar³ and Ar⁴ are independently a C₆₋₃₀ aryl or a C₃₋₃₀ heteroaryl that is substituted or substituted with one or more substituents, each substituent having up to 30 carbon atoms and up to 10 heteroatoms selected from N, S, O, P, As, Si, Sb, B, or Ge; and

L is a divalent linking group selected from a single bond, oxo, thio, sulfinyl, carbonyl, sulfonyl, methylene, or imino;

25 p is an integer equal to or greater than 1; and

m is an integer equal to 0 or 1.

40. The method of claim 38, wherein the cation of the triarylsulfonium arylsulfinate is selected from



5

or combinations thereof that are unsubstituted or substituted with one or more substituents selected from alkyl, alkylcarbonyloxy, alkynyl, alkoxy, alkoxycarbonyl, alkylthio, arylthio, aralkyl, alkenyl, aryl, arylcarbonyloxy, arylcarbonylamido, alkylcarbonylamido, aryloxy, aryloxycarbonyl, alkoxysulfonyl, aryloxysulfonyl, alkylsulfonamido, N-alkylaminocarbonyl, N-arylamino-

10 carbonyl, N-alkylsulfamyl, N-arylsulfamyl, alkylsulfonyl, arylsulfonyl, perfluoroalkyl, perfluoroalkylsulfonyl, azo, boryl, halo, hydroxy, mercapto, diarylarsino, diarylstibino, trialkylgermano, trialkylsiloxy, or combinations thereof.

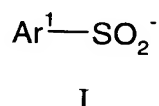
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41. The method of claim 38, wherein the triarylsulfonium arylsulfinate salt has an anion that is a benzenesulfinate substituted with an electron withdrawing group selected from halo, cyano, fluoroalkyl, perfluoroalkyl, carboxy, alkoxycarbonyl, aryloxycarbonyl, halocarbonyl, formyl, carbonyl, sulfo, alkoxysulfonyl,

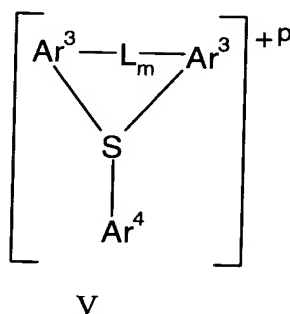
aryloxysulfonyl, perfluoroalkylsulfonyl, alkylsulfonyl, azo, alkenyl, alkynyl, dialkylphosphonato, diarylphosphonato, aminocarbonyl, or combinations thereof .

42. The method of claim 38, wherein the Ar¹ group of the triarylsulfonium
5 arylsulfinate salt is naphthyl or anthraquinonyl that is unsubstituted or substituted with an electron withdrawing group or an electron withdrawing group in combination with an electron donating group.

43. A triarylsulfonium arylsulfinate salt comprising:
10 an anion of Formula I



wherein Ar¹ is a substituted phenyl, an unsubstituted or substituted C₇₋₃₀ aryl, or an
unsubstituted or substituted C₃₋₃₀ heteroaryl, said substituted Ar¹ having a substituent
15 that is an electron withdrawing group or an electron withdrawing group in combination with an electron donating group; and
a cation according to Formula V



20 wherein

each Ar³ and Ar⁴ are independently a C₆₋₃₀ aryl or a C₃₋₃₀ heteroaryl that is substituted or substituted with one or more substituents, each substituent having up to 30 carbon atoms and up to 10 heteroatoms selected from N, S, O, P, As, Si, Sb, B, or Ge; and

25 L is a divalent linking group selected from a single bond, oxo, thio, sulfinyl, carbonyl, sulfonyl, methylene, or imino;

p is an integer equal to or greater than 1; and

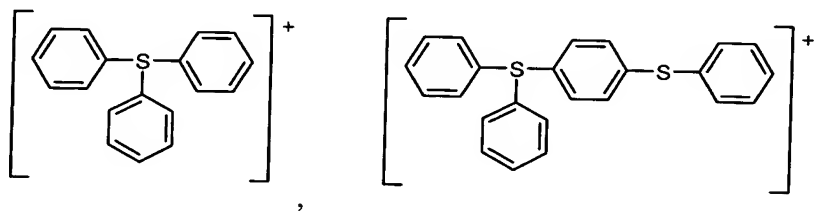
m is an integer equal to 0 or 1.

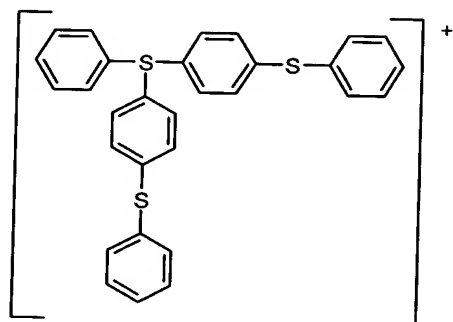
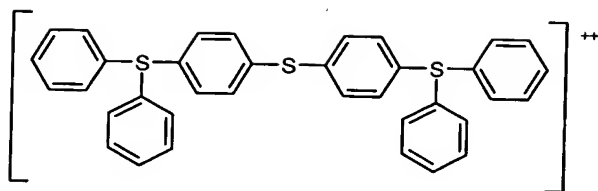
44. The triarylsulfonium arylsulfinate salt of claim 43, wherein the Ar¹ group of the arylsulfinate salt is a substituted phenyl, a unsubstituted or substituted naphthyl, or an unsubstituted or substituted anthraquinonyl, said Ar¹ group having an electron withdrawing group or an electron withdrawing group in combination with an electron donating group.

45. The triarylsulfonium arylsulfinate salt of claim 43, wherein the Ar¹ group of the arylsulfinate anion is phenyl substituted with an electron withdrawing group selected from halo, cyano, fluoroalkyl, perfluoroalkyl, carboxy, alkoxycarbonyl, aryloxycarbonyl, halocarbonyl, formyl, carbonyl, sulfo, alkoxysulfonyl, aryloxysulfonyl, perfluoroalkylsulfonyl, alkylsulfonyl, azo, alkenyl, alkynyl, dialkylphosphonato, diarylphosphonato, aminocarbonyl, or combinations thereof.

46. The triarylsulfonium arylsulfinate salt of claim 43, wherein the triarylsulfonium arylsulfinate salt has an anion selected from 4-chlorobenzenesulfinate, 4-cyanobenzenesulfinate, 4-ethoxycarbonylbenzenesulfinate, 4-trifluoromethylbenzenesulfinate, 3-trifluoromethylbenzenesulfinate, 1-anthraquinone sulfinate, 1-naphthalenesulfinate, or 2-naphthalenesulfinate.

47. The triarylsulfonium arylsulfinate salt of claim 43, wherein the triarylsulfonium arylsulfinate salt has a cation selected from





or combinations thereof that are unsubstituted or substituted with one or more substituents selected from alkyl, alkylcarbonyloxy, alkynyl, alkoxy, alkoxy carbonyl, alkylthio, arylthio, aralkyl, alkenyl, aryl, arylcarbonyloxy, arylcarbonylamido, alkylcarbonylamido, aryloxy, aryloxy carbonyl, alkoxy sulfonyl, aryloxy sulfonyl, alkylsulfonamido, N-alkylaminocarbonyl, N-arylaminocarbonyl, N-alkylsulfamyl, N-arylsulfamyl, alkylsulfonyl, arylsulfonyl, perfluoroalkyl, perfluoroalkylsulfonyl, azo, boryl, halo, hydroxy, mercapto, diarylarsino, diarylstibino, trialkylgermano, trialkylsiloxo, or combinations thereof.